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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,378	06/26/2003	Jong Sam Kim	2336-184	4731

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EXAMINER
CONNELLY CUSHWA, MICHELLE R

ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 12/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/606,378	KIM ET AL.	
	Examiner	Art Unit	
	Michelle R. Connelly-Cushwa	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-17 is/are pending in the application.

4a) Of the above claim(s) 8-17 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-7 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) 1-17 are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 26 June 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Invention I, claims 1-7 in the reply filed on October 21, 2004 is acknowledged. The traversal is on the ground(s) that Applicant believes that search and examination of the entire application would not place a serious burden on the Examiner because in the relevant art, references often describe the device's structure and manufacturing methods. This is not found persuasive because although some of the relevant art may describe both the structure and manufacturing methods of the device, not all of the art does, and since these inventions are distinct and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

The requirement is still deemed proper and is therefore made FINAL.

According, claims 8-17 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

Seven (7) sheets of formal drawings were filed on June 26, 2003 and have been accepted by the Examiner.

Specification

Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Novotny et al. (US 6,751,395 B1) in view of Rodgers et al. (US 6,507,138 B1).

Regarding claim 1; Novotny et al. discloses a MEMS variable optical attenuator (see Figures 1, 4, 5A and 5B) for attenuating the amount of light to a designated value by means of an electrical control signal (see column 4, line 10, through column 5, line 33), comprising:

- a substrate (101) with a flat upper surface;
- an optical transmitting terminal (input optical fiber, 111) and an optical receiving terminal (output optical fiber, 112), arranged on the upper surface of the substrate (101) so that their optical axes coincide with each other;
- a movable electrode (510, see Figures 1 and 5A) arranged on the substrate and provided with a first comb portion that includes teeth (518) and that moves in a vertical direction of the optical axes;

- fixed electrodes (522A, 522B) fixed to the substrate and provided with a second comb portion that includes teeth (524A, 524B) interdigitated with the first comb portion; and
- an optical cut-off film (120) electrically connected to the first comb portion and being movable to a designated attenuation position between the optical transmitting and receiving terminals according to the movement of the first comb portion.

Novotny et al. does not disclose that a dielectric material film with permittivity of more than 3 is formed on facing side surfaces of teeth of at least one of the first and second comb portions.

Rodgers et al. teaches that the fingers (teeth) of electrostatic combs can be coated with a thin layer of silicon nitride to provide electrical insulation to reduce any possibility of short-circuiting the closely spaced fingers in electrostatic comb actuators. Therefore, one of ordinary skill in the art would have found it obvious to coat the fingers (teeth; 518, 524A and 524B) of both of the first and second comb portions of the invention of Novotny et al. with a dielectric material including silicon nitride, which has a permittivity of more than 3, in order to reduce the possibility of short-circuiting the first and second comb portions of the actuator.

Regarding claims 2; coating a thin layer of dielectric material on the fingers (teeth) of the first and second comb portions, as suggested by Rodgers et al., inherently involves the dielectric material being formed on facing side surfaces of the fingers (teeth).

Regarding claim 3; Rodgers et al. does not discuss the step coverage of the dielectric material, however one of ordinary skill in the art would have found it obvious to have the step coverage of the dielectric material deposited on the side surfaces of the fingers (teeth) have a step coverage as close to 100% as possible in order to ensure that the material completely coats the fingers (teeth) in order to reduce the possibility of short-circuiting the actuator. Therefore, one of ordinary skill in the art would have found it obvious to have the step coverage be more than approximately 60% to ensure that the material completely coats the fingers (teeth) to avoid short circuiting.

Regarding claim 4; the material suggested by Rodgers et al. is silicon nitride. Furthermore, one of ordinary skill in the art would have found it obvious to substitute other known insulative dielectric materials in place of the silicon nitride, including SiO_2, Ta_2O_5, TiO_2 and TaON to help prevent short circuiting of the actuator, since it appears that the invention would perform equally well regardless of the specific insulative material used.

Regarding claim 5; the dielectric material (silicon nitride) has a thickness (50-200 nanometers) sufficient to insulate a voltage corresponding to the electrical control signal, in order to reduce the possibility of short circuiting the actuator.

Regarding claims 6 and 7; the proposed combination of Novotny et al. and Rodgers et al. teaches all of the limitations of claims 6 and 7 as applied above, except for the film of Ta_2O_5 being at least approximately 10 nm thick. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the film of be at least approximately 10 nm thick, since is has been held that where

the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233), and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Conclusion

Any inquiry concerning the merits of this communication should be directed to Examiner Michelle R. Connelly-Cushwa at telephone number (571) 272-2345. The examiner can normally be reached 9:00 AM to 7:00 PM, Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B. Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general or clerical nature should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562.

Michelle R. Connelly-Cushwa

Michelle R. Connelly-Cushwa
Patent Examiner
December 13, 2004